

REMARKS

Claims 1-17, 25, and 27-29 are pending. By this Amendment, Claims 18-24 and 26 are canceled without prejudice or disclaimer, and Claims 1-10 are amended for clarity. Support for the amended claims is provided, for example only, by the content of the claims as originally presented; page 23, first paragraph of the originally filed application; page 42, first, second, and third paragraphs of the originally filed application; and Figures 1 and 2 of the originally filed application. Therefore, Applicants respectfully submit no new material is presented herein.

Pursuant to the telephone conversation on August 30, 2004 between Mr. George E. Oram, Jr. and the Examiner, Applicants affirm their election to continue prosecution of the invention of an ultra-thin copper foil with carrier as currently claimed in Claims 1-17, 25, and 27-29.

Personal Interview

Applicants respectfully appreciate the courtesies extended to Applicants' representatives during the personal interview conducted on January 4, 2005. The points discussed during the interview are incorporated herein.

Claims Rejected—35 U.S.C. § 112

Claims 6, 7, 9, and 10 are rejected under 35 U.S.C. § 112, second paragraph. The claims have been amended responsive to the rejection and the concerns expressed by the Examiner during the interview of January 4, 2005. Applicants respectfully request withdrawal of the rejection.

Claims Rejected—35 U.S.C. § 103

Claims 1-17, 25, 27-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,346,335 to Chen, et al. (hereinafter “Chen ‘335”) or U.S. Patent No. 6,660,406 to Yamamoto, et al. (hereinafter “Yamamoto ‘406”) or U.S. Patent No. 6,066,366 to Lin (hereinafter “Lin ‘366”).

Claims 1-5 each recite an ultra-thin copper foil with a carrier including, among other features, a peeling layer and a strike plating layer comprised of phosphorus-containing copper or phosphorus-containing copper alloy wherein the peeling and strike plating layers are composed of materials that are distinct and different from each other.

Chen ‘335 discloses a composite material (10) having a support layer (12), a metal foil layer (14), and a release layer (16) disposed between and contacting both the support layer (12) and the metal foil layer (14), wherein the release layer comprises, for example, nickel, chromium, copper, or iron and phosphates and chromates thereof.

Lin ‘366 discloses a process for making an ultra-thin foil comprised of providing for a copper or copper alloy foil carrier, cleaning said carrier, and thereafter treating said carrier with a chromic acid-phosphoric acid solution to apply a film on said carrier to render a subsequent deposit of copper or copper alloy foil thereon to be strippable therefrom.

Yamamoto ‘406 discloses a composite copper foil with carrier (2) for manufacturing a printed wiring board with resistor circuits comprising a metal layer for forming the resistor circuit between a copper carrier and a copper layer. The composite copper foil with carrier (2) is comprised of copper carrier (3), a copper foil layer (5), a nickel or nickel alloy layer (4) forming the resistor circuit disposed between the copper

carrier (2) and the copper foil layer (5), and copper microparticles (6) disposed on a side of the copper foil layer (5) opposite the nickel layer (4), wherein the nickel or nickel alloy layer (5) comprises nickel and, for example, chromium, copper, phosphorus, or iron.

Applicants respectfully note that the Office Action admits that none of the cited prior art references teach or suggest a strike plating layer comprised of a phosphorus-containing copper or copper alloy. See Office Action page 5, paragraph 4. The Office Action asserts that Yamamoto '406 teaches a nickel layer comprising a nickel-based alloy containing phosphorus, chromium, or copper. Office Action page 4, paragraph 6. Later, the Office Action asserts that Yamamoto '406 teaches a phosphorus containing copper layer. Office Action page 5, paragraph 5. The Applicants have reviewed Yamamoto '406 in great detail and are unable to locate any teaching or suggestion in Yamamoto '406 regarding a phosphorus-containing copper layer. Rather, Yamamoto '406 clearly and unambiguously discloses a nickel or nickel alloy layer containing phosphorus or copper or a combination of both. Yamamoto '406, column 3, line 67 through column 4, line 3 and column 4, lines 14-26. Claims 1-5 each recite an ultra-thin copper foil with a carrier including, among other things, a strike plating layer comprised of phosphorus-containing copper or phosphorus-containing copper alloy, not a nickel or nickel alloy layer containing phosphorus or copper or a combination of both.

Further, because Yamamoto '406 is directed to a composite copper foil with a carrier for manufacturing a printed wiring board with resistor circuits, adding phosphorus or copper to the nickel layer (4) for the purpose of increasing resistivity of the nickel layer (4) (Yamamoto '406, column 4, lines 4-7) does not provide a motivation for adding phosphorus to the phosphorus-containing copper or copper alloy layer of the present

invention whose purpose is stabilizing peel strength of the ultra-thin copper foil (Application, page 23, line 25), improving the coverage of the peeling layer (Application, page 23, lines 20-24), and greatly reducing the number of pinholes in the ultra-thin copper foil with a carrier (Application, page 23, lines 24-25).

Moreover, as admitted by the Examiner during the personal interview of January 4, 2004, Chen '335, Lin '366, and Yamamoto '406 each fail to teach or suggest having a peeling layer and a strike plating layer that are composed of materials that are different and distinct from each other. Claims 1-5 recite such a feature.

Claim 6 discloses, among other things, a surface roughness of 0.1 μm to 5 μm on a carrier foil surface that faces the ultra-thin copper foil, a surface roughness of 0.1 μm to 5 μm on an ultra-thin copper foil surface that faces the carrier foil, and copper or copper alloy layer provided on the peeling layer that covers 90% of the peeling layer surface. Claim 7 discloses, among other things, a surface roughness of 0.1 μm to 5 μm on a carrier foil surface that faces the ultra-thin copper foil, a surface roughness of 0.1 μm to 5 μm on an ultra-thin copper foil surface that faces the carrier foil, and a copper or copper alloy layer provided on the peeling layer that has a conductivity of at least 90%. Applicants have carefully reviewed Chen '335, Lin '366, and Yamamoto '406 and are unable to locate any discussion of surface roughness, layer conductivity, or layer coverage area anywhere within these references.

In order to establish a *prima facie* case of obvious under 35 U.S.C. § 103, the prior art reference(s) must teach or suggest all the claimed features. See *In re Royka*, 490 F.2d 981, 985 (CCPA 1974) and M.P.E.P. § 2143.03. Also, the prior art must suggest the desirability of the claimed invention. M.P.E.P. § 2143.01.

The Applicants respectfully traverse the rejection of Claims 1-17, 25, and 27-29, because the Office Action has not established a *prima facie* case of obviousness. Respecting Claims 1-5, neither Chen '335, Lin '366, nor Yamamoto '406 discloses a strike plating layer including phosphorus and copper, wherein the peeling layer and the strike plating layer are composed of materials that are distinct and different from each other. Respecting Claims 6 and 7, none of the cited prior art references disclose surface roughness, layer conductivity, or layer coverage area. As noted above, all claim features must be taught or suggested by the prior art. *In re Royka*, 490 F.2d at 985. Additionally, Yamamoto '406 does not provide a motivation to include phosphorus in a copper or copper alloy layer, because the function of the nickel alloy layer of Yamamoto '406 does not perform the same function as the phosphorus-containing copper or copper alloy layer of the present invention.

Therefore, Applicants respectfully submit that since the applied art of record fails to teach or suggest each and every feature recited by Claims 1-7 and the applied art of record does not provide a motivation to include phosphorus in the phosphorus-containing copper or copper alloy layer as recited in Claims 1-5, the Office Action has failed to establish *prima facie* obviousness.

Accordingly, Applicants respectfully submit Claims 1-7 should be deemed allowable.

Claims 8-17, 25, and 27-29 depend, either directly or indirectly, from Claims 1-7. Applicants respectfully submit these dependent claims should be deemed allowable for the same reasons Claims 1-7 are allowable, as well as for the additional subject matter recited therein.

Therefore, the Applicants respectfully request the rejection be withdrawn.

Conclusion

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding rejections, allowance of Claims 1-17, 25 and 27-29, and the prompt issuance of a Notice of Allowability are respectfully solicited.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 103203-00008.**

Respectfully submitted,
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Enclosures: Petition for Extension of Time (2 months)
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